Under the circumstances, the present inventors investigated the genetic recombination techniques in order to develop a method enabling production of sporozoite antigen of BC in a large amount, and as a result, successfully isolated and purified a gene encoding a desired BC protein useful for that purpose. Using this gene, it is possible to produce the sporozoite protein of BC in a large amount with the recombinant DNA technique.

That is, the present invention provides a gene encoding a protein from merozoite of *Babesia caballi*, a recombinant protein of *Babesia caballi*, an antibody capable of specifically binding to a 48kDa protein of rhoptry, a kind of extrusome, of *Babesia caballi* merozoite, a method for diagnosing equine babesiasis which comprises specifically detecting anti-*Babesia caballi* antibody in equine blood using said recombinant protein as an antigen, and a method for diagnosing equine babesiasis which comprises detecting the presence of merozoite of *Babesia caballi* in equine blood using said antibody.

The present invention, in one aspect, relates to a gene encoding a 48kDa protein of rhoptry of *Babesia caballi* merozoite. The gene according to the present invention encodes a protein having the amino acid sequence shown in SEQ ID NO: 2, or encodes a protein that has the amino acid sequence shown in SEQ ID NO: 2 with one to

several amino acid residues therein being deleted, substituted or added and that is immunologically reactive with an antibody or antiserum elicited by a 48kDa protein of rhoptry of BC merozoite.

The gene of the present invention has preferably the nucleotide sequence shown in SEQ ID NO: 1. Also, the gene of the present invention has a nucleotide sequence that hybridizes to a complementary sequence to the nucleotide sequence shown in SEQ ID NO: 1 and encodes a protein that is immunologically reactive with an antibody or antiserum elicited by a 48kDa protein of rhoptry of BC merozoite.

The gene and fragments thereof according to the present invention are also suitably used for diagnosis of equine babesiasis with procedures such as DNA probe technique or PCR.

The present invention, in the second aspect, relates to a recombinant protein of *Babesia caballi*. The recombinant protein of the present invention has preferably the amino acid sequence shown in SEQ ID NO: 2. The recombinant protein of the present invention also has the amino acid sequence shown in SEQ ID NO: 2 with one to several amino acid residues therein being deleted, substituted or added and is immunologically reactive with an antibody or antiserum elicited by a 48kDa protein of

rhoptry of BC merozoite.

The recombinant protein of the present invention may be expressed, for instance, from a host transformed with a DNA vector into which cDNA having the nucleotide sequence encoding the amino acid sequence shown in SEQ ID NO: 2 is incorporated. The recombinant protein of the present invention may also be expressed from lysogenic bacteria with recombinant phage prepared by infecting *E. coli* with phage into which cDNA having the nucleotide sequence encoding the amino acid sequence shown in SEQ ID NO: 2 is incorporated.

The present invention, in the third aspect, relates to an antibody capable of specifically binding to a 48kDa protein of rhoptry of *Babesia caballi* merozoite. The 48kDa protein of rhoptry of *Babesia caballi* merozoite to which the antibody of the present invention binds may be one naturally occurring or prepared by the recombinant technique. The antibody of the present invention is preferably a monoclonal antibody. The monoclonal antibody of the present invention includes BC11D and BC233D as described hereinbelow.

The present invention, in the fourth aspect, relates to an antigen comprising the recombinant protein of *Babesia caballi* merozoite. The antigen may be used for specifically detecting anti-*Babesia caballi* antibodies